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Research Paper

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Nutritional status among children under 5 years of age in Sulaymaniyah, Kurdistan Region, Iraq

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doi: [10.48047/AFJBS.6.15.2024.10887-10902](https://doi.org/10.48047/AFJBS.6.15.2024.10887-10902)**Abstract**

The early childhood nutrition diet plays a major role in maintaining health and immunity along with organ development and cognitive functioning. The markers that assess nutritional imbalance and malnutrition include underweight, stunting and wasting. The lack of nutrition prevents young children from reaching their full potential in terms of intellectual performance. However, the factors that contribute to malnutrition among young children include maternal health, socio-economic status, dietary behaviors, and other factors. The objective of the present study is to investigate the nutritional status among children under the age of 5 years in Sulaymaniyah, Kurdistan Region, Iraq. For the country like Iraq with ongoing political crisis and economic difficulties providing the required nutrition for the young children has become a challenging task. In this study, the records of patients from Sheeraka Hospital, Sulaymaniyah during the period of January 2022-March 2023 are analyzed to determine the prevalence of underweight, severely underweight, overweight, and obesity among young children. The primary data included patient's age, gender, height, weight and status of being breast-fed. The children are made into three age groups which include 0 to 11 months (less than 1 year), 12 to 23 months (1 to 2 years) and 24 to 59 months (2 to 5 years). By comparing the patient data to the WHO-UNICEF guidelines, the patients are divided into four weight categories: underweight, severely underweight, overweight, and obese. It has been noted that the number of infants who are overweight is higher than that of children between the ages of 1 and 2 and those between the ages of 2 and 5. However, a significant number of children between the ages of 2 and 5 are classified as being underweight. The worry of raising awareness to inform mothers or parents about the variables that contribute to malnutrition among young children is made clearer by the fact that the number of overweight children under the age of 0 to 11 months will still be considerable in 2023 through the month of March. In accordance with the degree of malnutrition identified in this study, a community-based nutrition programme ought to be established to deal with the problem locally. The study omitted a description of the numerous factors influencing children's malnutrition levels. Additional investigation should look at aspects including maternal variables, nutritional diversity, seasonal factors, and household food security that were not examined in this study. A focus on vulnerable populations, such as the most vulnerable and chronically malnourished children, is required for ongoing nutrition surveillance.

Keywords: malnutrition, underweight, severely underweight, overweight, obese, breast fed, nutritional therapy, nutrition surveillance

Introduction

During the years when children are growing and developing, a balanced diet is crucial. It helps the child build a solid foundation for maintaining health and instills healthy eating habits in them at an early age. Assuring appropriate brain and other organ development, raising a child's immunity to stave off infectious diseases, and enhancing their level of activity and cognitive functioning are three primary advantages of early childhood nutrition. It is impossible to overestimate the value of providing children with a good diet since it prepares them for a lifetime of living a balanced and healthy lifestyle. During the first 1000 days of life, a child's growth can be hindered by insufficient nutrition, which is linked to smaller birth weights and shorter adult heights from undernutrition. Child growth is an internationally accepted outcome reflecting child nutritional status. Children of all ages require the nutrition and energy that come from a varied and balanced diet. Young children require a different kind of healthy food than adults do. Many of the wholesome foods that experts recommend adults consume are unsuitable for toddlers and young children [1].

One of a number of markers used to assess nutritional imbalance and malnutrition that causes undernutrition (measured by underweight, stunting, and wasting) and overweight is child underweight. According to World Health Organization (WHO) Child Growth Standards, the underweight is referred to if, weight-for-age <-2 standard deviation from the median of the World Health Organization (WHO) Child Growth Standards among children under 5 years of age.

The main causes of inadequate weight gain in children are inadequate dietary energy intake, improper protein, fat, and carbohydrate intake, malabsorption of nutrients, and numerous underlying health conditions like medical, developmental, or behavioral issues, inadequate food intake, socioeconomic difficulties at home, the mother's health during pregnancy, infection exposure, and certain medications that may stunt growth. Malnutrition in children is caused by the intricate interaction of many factors, including poverty, maternal health, illiteracy, diseases like diarrhea, the home environment, dietary behaviors, hand washing and other hygiene practices.

In recent years, there has been an increasing number of preschoolers with diet-related health issues. A huge consumption of unhealthy meals that are heavy in carbohydrates and unhealthy fats means that children are not consuming enough of the nutritious nutrients that are required to support brain development, according to studies. It's important to keep in mind that children's poor eating habits are frequently not the product of neglectful parenting. Nutrient-dense foods can be expensive for families on a limited budget, such as fresh fruits and vegetables, lean meats, and healthy grains. These families might find that fast food, which usually has less nutritional value, is less expensive and thus demonstrating how children's growth is impacted by the socioeconomic status [2]. The other important growth indicators among children include overweight and obesity. The term "overweight child" is used to describe a child who is excessively large for his or her height. This kind of malnutrition is brought on by an imbalance between calorie expenditure and food intake, which increases the risk of noncommunicable diseases in later life. One of the nutritional target indicators established by the World Health Assembly is child obesity.

According to World Health Organization (WHO) Child Growth Standards, the overweight is referred to if, the weight for height $>+2$ standard deviation from the median of the World Health Organization (WHO) Child Growth Standards) among children under 5 years of age and obesity is referred to if the weight-for-height greater than 3 standard deviations above the WHO Child

Growth Standards median [3]. Obesity and overweight are primarily caused by an imbalance in energy between calories consumed and calories burned. Globally, there has been a rise in the consumption of calorie-dense foods that are high in fat and sugar, as well as a rise in physical inactivity as a result of the sedentary nature of many occupations, evolving transportation options, and escalating urbanization. A lack of supportive policies in areas including health, agriculture, transportation, urban planning, environment, food processing, distribution, marketing, and education often leads to environmental and sociological changes that affect dietary and physical activity habits.

Children in low- and middle-income nations are more susceptible to malnutrition during pregnancy, as a newborn, and as a young child. These kids are also exposed to diets that are high in fat, sugar, salt, and energy, but low in micronutrients. These foods are typically less expensive, but their nutritional value is also reduced. These eating habits, along with reduced levels of physical activity, cause a dramatic rise in childhood obesity, yet the problems associated with undernutrition remain unresolved [4]. It is impossible to overestimate the significance of food during pregnancy. Pregnancy has increased the importance of many critical nutrients. Making daily good meal choices will make it simpler to provide the infant with what he or she needs to grow. Furthermore, it will guarantee that the mother and the child both gain the proper amount of weight. Complete improvement in a woman's physical and dietary well-being before and during pregnancy would support healthy fetal development, better labor and delivery outcomes, higher perinatal survival, and perhaps even longer-term health for both mother and child.

Studies have demonstrated that breast milk consumption throughout infancy reduces the incidence of chronic illness later in life. Breast milk is best matched to meet an infant's nutritional needs for the first 4 to 6 months of a typical infant's life. Breast milk composition is influenced by the mother's diet and nutritional reserves in her adipose tissue. Additionally, nursing is advantageous because it fortifies parents' bonds with their children and shields the infant against illnesses, infections, and allergies. It has also been demonstrated that breastfed infants have higher IQs [5].

There is evidence that mothers with gestational diabetes who exclusively breastfeed for at least six months reduce their chance of developing Type 2 diabetes and protect their children from the dangers of childhood obesity. In India, there is a severe protein-energy malnutrition affecting close to 1% of preschoolers. Subclinical malnutrition affects over half of 5-year-old children with underweight signs, stunting, and wasting. A poor or insufficient diet may lead to the catabolism of body tissues and the failure to supply an energy substrate [6]. Small stature is a result of persistent malnutrition in childhood. In underdeveloped nations, malnutrition is responsible for 9.7 million deaths of children under the age of five. Indian children under five who are underweight are a result of a severe or chronic food deficit. Often, moms who did not eat well before, during, or after pregnancy pass that trait on to their offspring. In addition to all of this, there are other elements that affect a child's growth and development, including genetics, sex, hormones, the environment, physical activity, and socioeconomics. However, the Global Strategy for Infant and Young Child Feeding was developed by WHO and UNICEF to improve children's survival, development, and health. A comprehensive implementation plan for maternal, baby, and early child nutrition was endorsed by the World Health Assembly in 2012, and it includes a list of six global nutrition targets with the following goals by 2025:

1. Decrease the proportion of stunted children under five by 40%.
2. Cut the prevalence of anemia in women who are fertile by 50%
3. Cut birthweight underweight by 30%.
4. Prevent the rise in childhood obesity.
5. Increase the proportion of infants exclusively breastfed to at least 50%.
6. Bring down the waste rate in kids under five to under 5%.

Juvenile manifestations of a variety of physical and psychological effects of childhood overweight and obesity have been studied. Pediatric obesity is most frequently associated with osteoarticular (flat feet, arthritis, limited mobility), psychological (depression, eating disorders), and metabolic impacts (glucose intolerance, high blood pressure). Obesity has significant emotional, social, and psychosocial impacts on children and adolescents. An increasing prevalence of anxiety and depression in children has now been related to childhood obesity. Additionally, overweight kids often have lower self-esteem and develop less socially and psychologically. They are more likely to participate in unhealthy behaviors like drinking and smoking and have lower self-esteem. Additionally, gastrointestinal cancer, cardio-circulatory (high blood pressure), and other diseases are more likely to strike young children who are overweight or obese.

The following table includes the recommended daily intake of nutrients with respect to the age group.

Table No.1: Recommended daily intake of nutrients.

Nutrients	Age 0-6 months	Age 7-12 months	Age 1-3 years
Carbohydrate	60mg/day	95 g/day	130 g/day
Fat	31 g/day	30 g/day	Not determined
Protein	1.52 g/kg/day	1.2 g/kg/day	1.05 g/kg/day
Calcium	200 mg/day	260 mg/day	700 mg/day
Iron	0.27 mg/day	11 mg/day	7 mg/day
Zinc	2 mg/day	3 mg/day	3 mg/day

The aim of the study is to investigate the nutritional status in Sulaymaniyah, Kurdistan region. To achieve this, records of patients are drawn from a pool of target patient population of Sheeraka hospital and data was collected and analyzed.

For a nation like Iraq, where there are ongoing conflicts, economic difficulties, a weak health care system, ongoing political crises, and several other problems, this subject is of great significance. Additionally, as can be seen from the surroundings, children's nutrition is far from a healthy way of life, which is what inspired us pharmacists to bring up the subject and spread awareness. As pharmacists, we can help parents and provide them with the information they need to maintain a healthy, balanced diet and lifestyle for their kids and prevent potential malnutrition.

Malnutrition, obesity, and underweight problems, as well as vitamin A, zinc, iron, and other mineral deficiencies brought on by a subpar diet, can all be treated by pharmacists. Pharmacists can help patients set particular goals to improve their lifestyles. Parents of young children usually seek timely and reliable information on nutritional matters, such as breastfeeding, formula feeding, supplemental foods or dietary supplements, vitamins, etc., in order to make informed decisions. A nearby pharmacist can significantly contribute to the promotion of infant health through nutrition. Human milk is the healthiest dietary source for infants.

Pharmacists can significantly contribute to the promotion of breastfeeding by helping with the natural infant feeding process, removing barriers to success, and offering additional resources as necessary. As the most approachable and dependable members of the community healthcare system, pharmacists can provide early access to assistance and services. The importance of this cannot be overstated, particularly for newlywed mothers. Pharmacists can offer breastfeeding guidance to expecting and postpartum mothers based on the recommendations and resources of the American Academy of Pediatrics (AAP). The American Academy of Pediatrics (AAP) suggests breastfeeding infants for six months, followed by at least a year of doing so while also eating complementary foods, and then continuing for as long as desired after that. The pharmacist can educate women about the long-term advantages of breastfeeding, such as a decreased risk of acquiring specific diseases. They can also provide advice on appropriate breastfeeding techniques. Supplements and feeds for infant formula are widely available on the market. Parents and other caregivers often experience fear and uncertainty. Pharmacists receive training on the safety and legal requirements of these medications in order to provide parents with a proactive resource [7].

Methodology

Data Collection

Access and permission to conduct this research study is obtained from Sheeraka Hospital, Sulaymaniyah, Kurdistan Region and Komar University of Science and Technology, Sulaymaniyah, Kurdistan Region. The required data which included the growth status of children under 5 years of age is collected from the database of Sheeraka Hospital, Sulaymaniyah, Kurdistan Region. The main objective of this study is on the number of infants and children who are underweight, severely underweight, overweight and obese and the number of infants and children who are dependent on mothers or other sources of milk as their main source of food and nutrition. The children are grouped into three groups based on their age. The three groups include 0 to 11 months (less than 1 year), 12 to 23 months (1 to 2 years) and 24 to 59 months (2 to 5 years). The data is collected from January 2022 till March 2023.

Results

It is observed that the number of children who are overweight under 1 year of age is more significant than the number of children under 1 to 2 years and the number of children under 2 to 5 years of age. However, a significant number of children are categorized as underweight under age of 2 to 5 years. The following table no.2, table no.03 and figure no.01 shows the nutritional status of children from January 2022 till March 2023 in the region of Sulaymaniyah, Kurdistan Region.

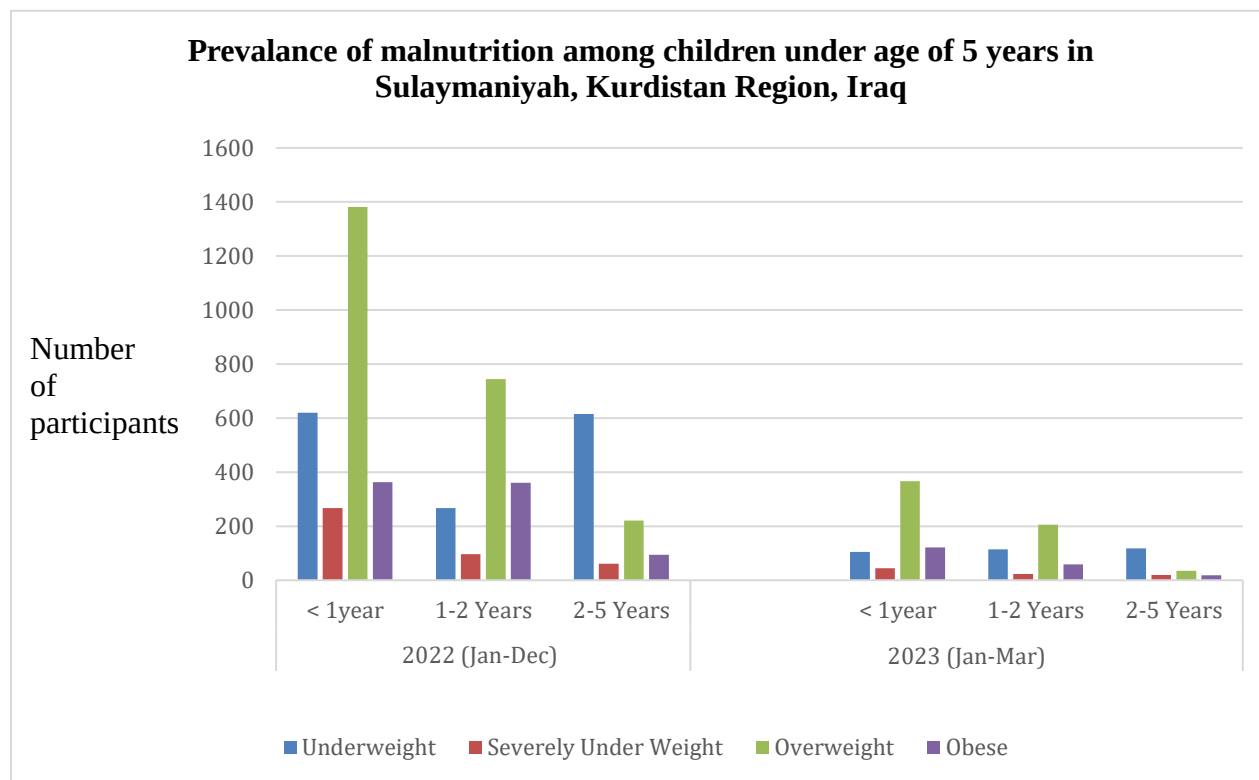
Table No.2: Prevalence of malnutrition among children under 5 years of age in Sulaymaniyah, Kurdistan Region in 2022 (January-December)

Nutritional Status	Number of Subjects		
	<1 Year	1-2 Years	2-5 Years
Underweight	620	267	615
Severely underweight	267	97	61
Overweight	1382	744	221
Obese	363	361	94

Table No.3: Prevalence of malnutrition among children under 5 years of age in Sulaymaniyah, Kurdistan Region in 2023 (January-March)

Nutritional Status	Number of Subjects		
	<1 Year	1-2 Years	2-5 Years
Underweight	105	114	118
Severely underweight	44	23	19
Overweight	367	205	35
Obese	121	59	18

Figure No.01: Prevalence of malnutrition among children under 5 years of age in Sulaymaniyah, Kurdistan Region



The number of overweight children under the age of 0-11 months still remain significant in 2023 till the month of March thus, helping us to realize the concern of increasing awareness to educate mother or parents regarding the factors that contribute to the malnutrition among children.

For better analysis the number of children is categorized into two groups based on gender.

The following table no.4, table no.05, table no. 06, table no. 07, figure no.02 and figure no.03 gives the information about the nutritional status among boys and girls from January 2022 till December 2022 and January 2023 till March 2023 respectively.

Table No.04 Nutritional status among boys under 5 years of age in Sulaymaniyah, Kurdistan Region in 2022 (January- December)

Nutritional Status	Number of Subjects		
	<1 Year	1-2 Years	2-5 Years
Underweight	290	199	267
Severely underweight	144	54	61
Overweight	817	424	108
Obese	258	263	50

Table No.05 Nutritional status among girls under 5 years of age in Sulaymaniyah, Kurdistan Region in 2022 (January- December)

Nutritional Status	Number of Subjects		
	<1 Year	1-2 Years	2-5 Years
Underweight	330	262	348
Severely underweight	123	43	49
Overweight	565	320	113
Obese	139	98	44

Table No.06 Nutritional status among boys under 5 years of age in Sulaymaniyah, Kurdistan Region in 2023 (January- March)

Nutritional Status	Number of Subjects		
	<1 Year	1-2 Years	2-5 Years
Underweight	56	73	64
Severely underweight	16	14	11
Overweight	217	120	20
Obese	80	38	13

Table No.07 Nutritional status among girls under 5 years of age in Sulaymaniyah, Kurdistan Region in 2023 (January- March)

Nutritional Status	Number of Subjects		
	<1 Year	1-2 Years	2-5 Years
Underweight	49	41	54
Severely underweight	28	9	11
Overweight	150	85	15
Obese	41	21	5

Figure No.02: Prevalence of malnutrition among boys and girls under 5 years of age in Sulaymaniyah, Kurdistan Region (January 2022-December 2022)

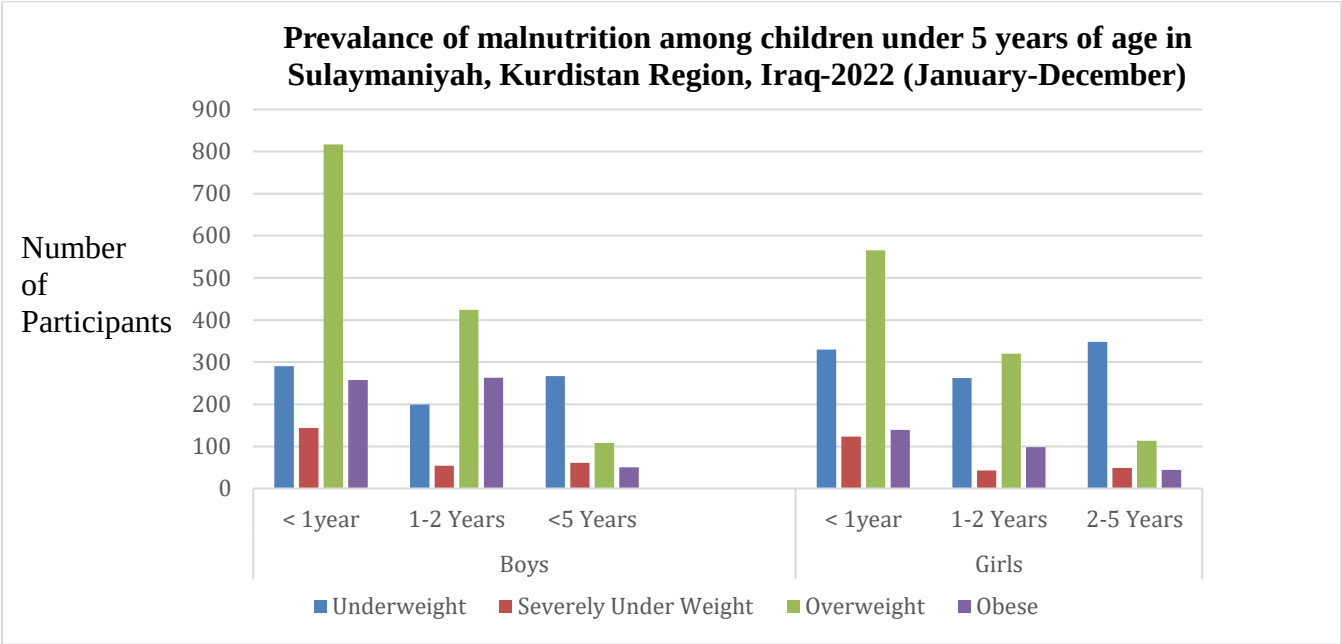
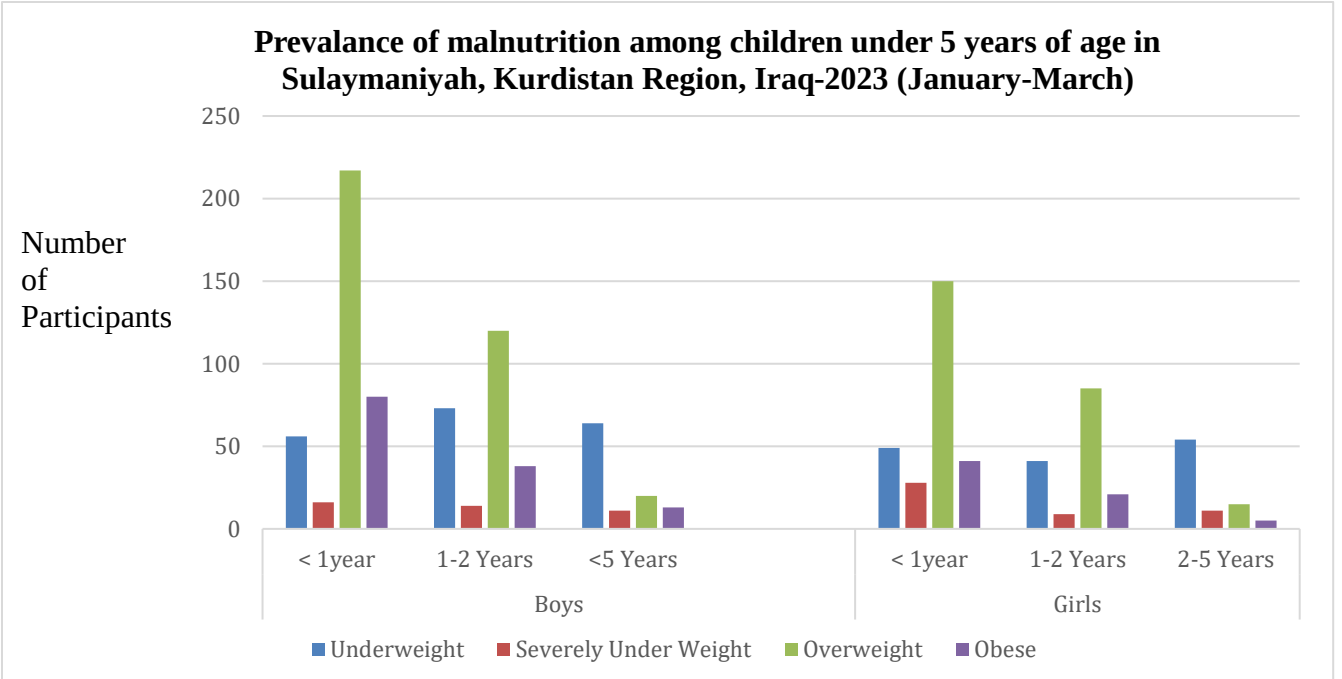


Figure No.03: Prevalence of malnutrition among boys and girls under 5 years of age in Sulaymaniyah, Kurdistan Region (January 2023-March 2023)



The number of overweight children, both boys and girls are predominantly seen in the specified study time under the age of 0-12 months and 12-23 months. The number of underweight is significantly higher among girls in the year 2022. However, in 2023 till the month of March, the number of underweight is seen higher among boys when compared to girls.

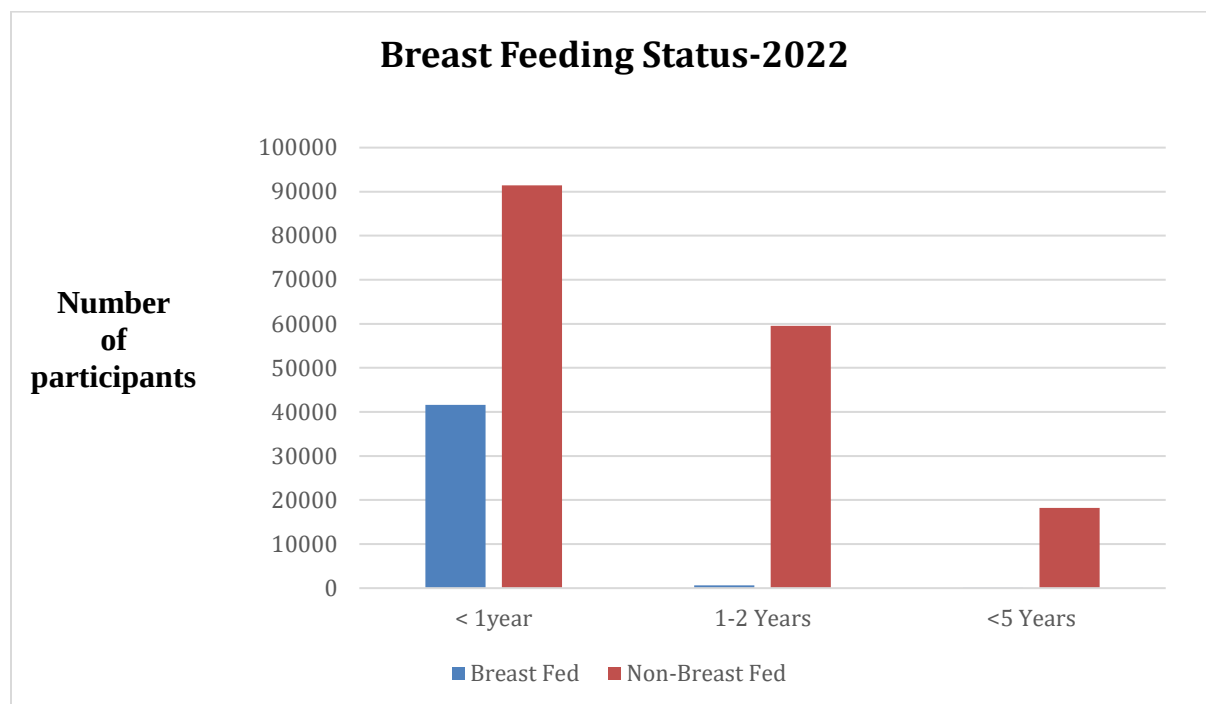
From the present investigation, it is seen the status of overweight and underweight is predominantly seen in the age groups of less than 1 year and 1 to 5 years respectively in both boys and girls. A significant pattern which includes the increase in the number of underweight children is seen as the age progresses is observed. This has laid a challenge for health care providers in bring about the balance in the nutritional status among children.

The present study ensures the necessity of further consideration in finding the associated factors that are affecting the child's growth. The possible factors that affect the child's growth include underlying health conditions, dietary behaviors, physical activities, maternal health, socio economic status and home environment. The present study needs additional investigation on associated factors which helps in giving personalized attention to the children and thus helping them to gain their nutritional needs.

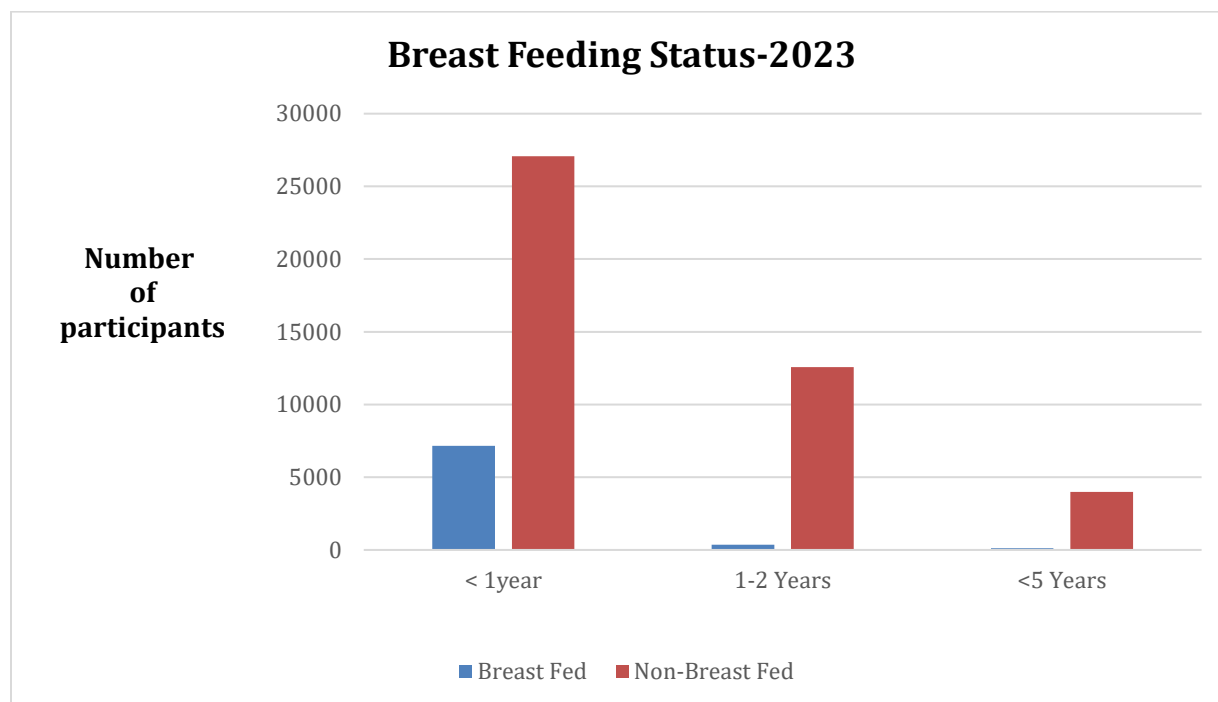
However, a significant increase in the number of non-breast fed children is seen and there can a possible correlation with malnutrition which is given in the following table no.08 table no.09, figure no.04 and figure no.05.

Table No. 08 Breast feeding status in in Sulaymaniyah, Kurdistan Region-2022 (January-December)

Feeding Status	Number of subjects		
	< 1 Year	1-2 Years	2-5 Years
Breast Fed	41615	636	48
Non-Breast Fed	91468	59543	18202

Figure No. 04 Breast feeding status in in Sulaymaniyah, Kurdistan Region-2022 (January-December)**Table No. 09 Breast feeding status in in Sulaymaniyah, Kurdistan Region-2023 (January-March)**

Feeding Status	Number of subjects		
	< 1 Year	1-2 Years	2-5 Years
Breast Fed	7153	368	123
Non-Breast Fed	27079	12570	3981

Figure No. 05 Breast feeding status in in Sulaymaniyah, Kurdistan Region-2023 (January-March)

The health care provider plays a major role in creating an awareness among people on how the associated factors affect the early development of a child.

Conclusion

Children who are malnourished are more likely to experience difficulties, such as a higher likelihood of contracting common diseases. It is advised to use common infection control methods like handwashing and avoiding contact with sick people. The recommended schedule for childhood vaccinations should be followed, and any missed immunizations should be renewed [18].

On the other hand, noncommunicable diseases including overweight, obesity, and their linked conditions can often be avoided. To avoid overweight and obesity, supportive settings and communities play a crucial role in influencing people's decisions by making it simple for people to choose healthier diets and frequent physical activity. A few changes in the lifestyle which include limiting energy intake from total fats and sugars, increased consumption of fruit and vegetables, as well as legumes, whole grains and nuts; and engaging in regular physical activity (60 minutes a day for children and 150 minutes spread through the week for adults) can help in regulating healthy weight of an individual.

Recommendations

A young child's healthy diet should consist of five pieces of different fruits and vegetables per day. Additionally, it should contain carbohydrates, dairy products, which are a good source of calcium, pulses, fish, eggs, and meat, all of which are good sources of protein, along with healthy fats and plenty of fluids. The child's energy needs should mostly be met by fats, especially if they are under 2 years old [19].

However, the Department of Health advises giving vitamin A, C, and D drops to all children between the ages of six months and five years. These are especially crucial for underweight kids since they might not be consuming a varied enough diet to get all the nutrients they require. It is advised to see a doctor to obtain the necessary vitamin drops and guidance. It is usually recommended to monitor a child's development under the guidance of a physician or general practitioner [20].

The main form of treatment for kids who have trouble gaining weight is nutritional therapy. Nutritional therapy aims to facilitate "catch up" weight gain, which is often two to three times the typical rate of weight gain for the child's age. Depending on the child's age and nutritional status, there are several ways to boost dietary energy (measured in calories); specific suggestions should be made by the child's dietician or health care provider. It could be advised in some circumstances to take a multivitamin supplement. By pumping breast milk and mixing it with a set amount of liquid concentrate or powdered formula for newborns, you can boost the number of calories in breast milk which is termed as "fortified human milk". This procedure should be performed under the supervision of health care provider or physician taking into consideration of child's safety.

Infants over one year old often require four to six feedings daily, whereas infants under one year old frequently require eight to twelve feedings daily. The dietary energy intake (measured in calories) of older infants can be boosted by adding rice cereal or formula powder to pureed foods.

However, older children may consume more dietary energy (measured in calories) if cheese, butter, or sour cream are added to vegetables or if calorie-fortified milk drinks are substituted for whole milk. Only when people have access to a healthy lifestyle will individual responsibility be fully realized. Therefore, it is crucial to support people in adhering to the above recommendations at the societal level through the sustained implementation of population-based policies that make regular physical activity and healthier eating options available, accessible, and affordable to everyone, especially the poorest people. A tax on beverages with added sugar is an illustration of such a measure.

The food industry can significantly contribute to the promotion of healthy diets by lowering the fat, sugar, and salt content of processed foods; making sure that all consumers have access to and can afford healthy and nutritious options; restricting the marketing of foods high in sugars, salt, and fats, especially those marketed to children and teenagers; and making sure that there are healthy food options available and supporting regular physical activity in the workplace.

Depending on the extent of malnutrition found in this study, a community-based nutrition program should be set up to address the issue locally. The study did not describe the various factors that affect the malnutrition status among children. It is possible to do more research to examine

elements that were not considered in this study, such as maternal factors, dietary diversity, seasonal factors, and household food security.

Continuous nutrition surveillance is necessary, with a focus on vulnerable populations including the most vulnerable and chronically malnourished children.

Acknowledgements

Access and Permission

Access and permission to conduct this research study is obtained from Sheeraka Hospital, Sulaymaniyah, Kurdistan Region and Komar University of Science and Technology, Sulaymaniyah, Kurdistan Region.

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